

SUBSISTENCE ECONOMIES AND ECONOMIC GROWTH¹

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I. Introduction

The concept of a subsistence economy has had considerable intuitive appeal as a description of underdeveloped areas. There is an apparent correspondence with characteristic conditions which, though rough, seems impressive. We, too, believe this is a useful concept and, in fact, can be even more useful than it has been, not only for underdeveloped countries but also for "underdeveloped" sectors of advanced economies. A careful analysis of subsistence conditions can not only help isolate the crucial features of subsistence economies but also suggest hypotheses about the sources of growth.

Much of the recent analysis of economic growth has, so to speak, jumped into the middle of the problem and concentrated on "conditions of growth:" "warranted," "sustained," "take-off" and so on. In an earlier tradition, Schumpeter and, recently, W. Arthur Lewis, have started with description of an economy which is not growing and then asked why and how it may change. Each approach

1. The authors are grateful for the suggestions of Mr. S. Chakravarty and Professors Hagen, Lefebvre and Rosenstein-Rodan.

has its virtues but the special appeal of the earlier one is that it makes possible a more thorough analysis of the transition from stagnation to growth. This essay will follow in that earlier tradition in its concern with the characteristics of subsistence economies and some aspects of their transition to growing economies.

It would be possible to define "subsistence" economies in such a way as to cover a wide variety of cases. However, it is not our intention to cover variety but to expose it and at the same time to indicate analytical methods which bring order to it and highlight significant relationships. One aspect of the research effort on underdeveloped economies in recent years has been the search for the grail of a "general theory" of economic development. For a number of reasons no available "general" theory seems adequate. First of all, the demands on growth theory to provide guides to pressing issues of current economic development are quite specific. Moreover, the underdeveloped regions display quite widely differing characteristic features which create major problems when the attempt is made to subsume all of them within a single model. Finally, of course, the problems of growth, even in specific cases, are analytically quite difficult, involving, as they do, intertemporal, intersectoral and locational issues.

In this paper we attempt to apply economic analysis to the behavior of "traditional" economies--a range of problems which economists have shown some willingness to turn over to sociologists and anthropologists. The failure of some "general" economic principle

to operate is frequently explained by adducing some particular "noneconomic" motive or a sociological or anthropological "quirk." We do not have a new type of economics to apply, but we are willing to adjust the usual assumptions of economics to fit the particular situations encountered in underdeveloped areas and even insist upon the necessity of doing so. Having done this, familiar analytical methods can be applied with profit.

In the next section some alternative ways of looking at subsistence economics are examined. A simple analytical description of subsistence sectors is presented which is then used in succeeding sections. These are devoted to a description of particular sectors under subsistence conditions and to the analysis of some features of the process of transition to economic growth.

II. Subsistence Economies

A. The Varieties

Perhaps the most common connotation of subsistence is an economy in which all, or a large part, of the population lives at, or close to, the minimum physical standard of life. It may have been brought to this level as the result of the operation of Malthusian processes of population growth in relation to the growth of output of food and other necessities. Practically, of course, it will make a difference for savings and investment potentials and the processes of growth whether it is all or a part of the population which is at subsistence

levels. However, we will return to the discussion of inequality in subsistence economies below.

Of course, it is possible to imagine that processes other than the Malthusian which might limit a population to physical subsistence conditions short of the "natural" boundaries imposed by population growth and diminishing returns. The famous "potlatch" is constantly cited to bedevil economists into checking the cultural relevance of their behavioral assumptions. This reminder to economists working on underdeveloped areas is not out of place.

The Malthusian notion of subsistence is clear cut because it is an extreme position. Short of that extreme position no other such fixed point can be established in the subsistence spectrum. One man's and one nation's luxuries may be another's necessities. Some societies have been known to adopt drastic measures to avoid income levels to which other societies become accustomed. The powerful and pervasive personal and cultural factors, which affect the evaluation of what constitutes subsistence operate differently in each individual and society.

In the Malthusian case minimum physical requirements derive their significance from their operation as an absolute check to population and income growth. However, in the process of a decline in per capita income under population pressure, subsistence might be reached, in the sense of savings dropping away to nothing long before income fell to the minimum physical requirements level. Partial checks to further population growth also develop short of the physical minimum levels of income as the rate of new family

formation drops, and so on. These are not merely logical possibilities, but seem in fact to occur frequently and to be important. Under conditions of diminishing returns, growth in output can not occur without savings and investment. There are, of course, rare situations of constant or even increasing returns to population growth, but that cannot be the normal expectation.

It may violate accepted usage and be found somewhat jarring to use "subsistence" to describe all those economies with zero savings. However, we are willing to extend the word and violate convention in order to draw attention to the range of conditions less extreme than, but similar to, Malthusian subsistence in their implications for growth. For the extended definition to be useful, it must be given more content.

The economist needs a framework of classification and analysis which summarizes the economic implications of all those influences which affect the intertemporal distribution of income between consumption and saving. The complete specification of such a framework is a complicated problem in capital theory. It is not our intention here to enter deeply into such issues but to develop some simple and suggestive models which will help to organize our thinking about subsistence economies. Since our objective is not to provide comprehensive analytical conclusions, but rather only to organize the relevant factors, we may escape some of the dangers inherent in simplicity.

It is a logically exhaustive description to stipulate that spending-saving decisions of individuals depend on their time preferences and the intertemporal substitution possibilities open to them. Such a description covers all possible cases; being so general it does not go very far in increasing our understanding of reality unless something more is specified about the characteristics of particular situations.

Zero saving logically can and, in fact, has occurred at a wide variety of income levels and in various existing economic models. In this paper we are interested only in relatively low income level subsistence conditions and are concerned to make the point that even this can occur in different ways.¹

In the limit of the Malthusian case, for example, no saving will take place whatever the intertemporal substitution possibilities available via the interest rate or the real productivity of saving. The ultimate nature of the circumstances forbid it. Short of the Malthusian limit the usual and, we believe, reasonable expectation is that the degree of preference of present over future consumption varies inversely with the level of income.

The classical stationary state and modern "stagnation" on the other hand are the result, not so much of a high preference for present over future consumption, but of progressively diminishing returns to all factors. In these cases it is the decline in the real

1. Some obvious analogies with high income level stagnation will occur to the reader.

productivity of saving which brings about stagnation, not Malthusian pressure, which destroys saving through dire poverty.

One function of foreign aid may be described as lifting incomes to levels at which, given existing intertemporal substitution possibilities, sufficient saving will take place to sustain growth. Frequently in underdeveloped areas the productivity of investment is quite low, at least on the scale available to the individual household. This, in some situations, may be the consequence of relatively primitive technologies. "Imperfections" which limit access to investment opportunities are probably important in other circumstances. If such obstacles to increased productivity of investment are overcome, saving may be induced without changes in time preference. Technical assistance, another aspect of efforts to aid underdeveloped areas, can be interpreted as an effort to increase the productivity of saving.

Provision of social overhead capital which increases the productivity of private saving and investment may have similar effects.

There may be no general agreement as to whether policies are feasible which are designed to increase saving by directly influencing the time-preference curves of individuals. Some of the exhortation which accompanies development programs could be interpreted in this way,¹ as can government action to force saving

1. The examples of "national effort" cited by Professor Kindleberger in "Group Behavior and International Trade," Journal of Political Economy, February 1951, pp. 30-46, may also fit this description in some respects.

without general support; individual time preferences do not shift in this case but preferences of the decision-making body supercede those of individuals.

Whether or not time preferences can be operated on directly, they are undoubtedly influenced indirectly by economic changes which in turn effect expectations and the individual's notion that he can effectively plan and provide for the future. Sociological changes which are often associated with economic growth, as, for example, the decay of the extended family system that accompanies urbanization will also influence saving-spending behavior.

The pattern of income distribution is an important determinant of over-all spending-saving behavior. This relationship has been much discussed in the literature on economic development. The only further point which we should like to make here, and which shall be elaborated below, is that saving does not necessarily depend on the maintenance of, or an increase in, inequality. The previous discussion of time preference applies as well to the high income recipients in low per capita income countries as to the lower income recipients.

The occurrence of low-level subsistence is, then, not simply and only a function of income levels. Professor Everett Hagen has, we believe, quite rightly made the point that savings can be generated in many societies in which there is currently full consumption because of low levels of per capita income levels if individual time preferences can be altered or are superceded. This observation

is a valuable counter to the view that the primary bottleneck in development is lack of capital in the sense that there are certain, more fundamental factors which account for the inadequacy. It may still be true, however, that capital availability is the major operational factor.

B. Resource Allocation in Subsistence Economies.

The nature of the adjustment of the labor supply in subsistence economies to the complementary resources which are available deserves more critical attention than it has received. This adjustment is usually assumed by economists to be made in accordance with the familiar marginal, maximizing principles. On the other hand anthropologists will typically deny that rational behavior in this sense is characteristic of "firms" in subsistence economies. There is, in fact, considerable question as to the extent to which there is complete rationality in using resources in firms in advanced countries. The behavior which does seem to characterize subsistence firms is the use of all available resources within the given, acceptable social patterns, to obtain the maximum possible output. Yet, it is widely believed by economists that competitive pressures and the relative effectiveness of marginal decisions serves adequately to separate the quick and the dead. Therefore, whatever its relation to individual psychology and behavior, the assumption of rational, profit-maximizing entrepreneurial activity is generally considered to be the best basis for an economic theory of both subsistence economies and sectors and advanced economies.

We suggest, however, that in subsistence economies structure of "firms" is typically such that there is no advantage or relative effectiveness of marginal decisions. In this case then individual behavior does not correspond to that of marginal maximization as in advanced economies and there is no mechanism to insure that the system worked as if it did.

In low-level subsistence economies, and such sectors of advanced economies, the basic production organization is the household. There may be some workers who are not members of the familial unit, but, quite often, these are also treated as if a responsibility existed for them similar to that for family members. By contrast in the corporate form which dominates advanced economies all the members of the organization are employees and treated with a good deal of impersonality.

In small-scale household firms the labor availabilities as well as most other costs are fixed. In agriculture land rents, implicit or explicit, frequently are not a function of output on each unit of land; those cases in which they are, that is, share-cropping, will be analyzed separately. Fertilizer and certain types of farm maintenance requirements have some degree of variability with output but fertilizer inputs at least are relatively small in low income areas and farm maintenance represents mainly labor costs in such situations. In industrial activity material requirements are a variable cost but, to the extent there is production to order rather than for stock, these may also be considered as if they were fixed.

In firms in which all costs are fixed there is no difference between rational profit maximization and output maximization. The latter is the rational rule. The anthropological "quirk" of household firms which pay no attention to marginal equalities turns out to be just good sense.

It is true, however, and we suggest it is important, that such firms will tend to use resources in different combinations and produce at different output levels as compared to firms in which labor costs are variable. When costs are variable, the logic and relative effectiveness is inescapable of output and input decisions which require on returns on the margin to just cover costs on the margin. Though it is possible it cannot in general be expected that the "marginal" and the "total" decision would be equivalent.

This point can be demonstrated very simply in Figure 1. With the given total revenue in relation to output¹ and the total cost relation A, in which there are a high proportion of variable costs, the optimum, profit-maximizing output is X_1 at which marginal revenues are equal to marginal costs. If all the costs at X_1 are turned into fixed costs, X_1 is still the profit-maximizing output if the available factors do not change. However, we do not believe that it can, in general, be assumed that households will adjust their internal labor supply to bring them precisely to

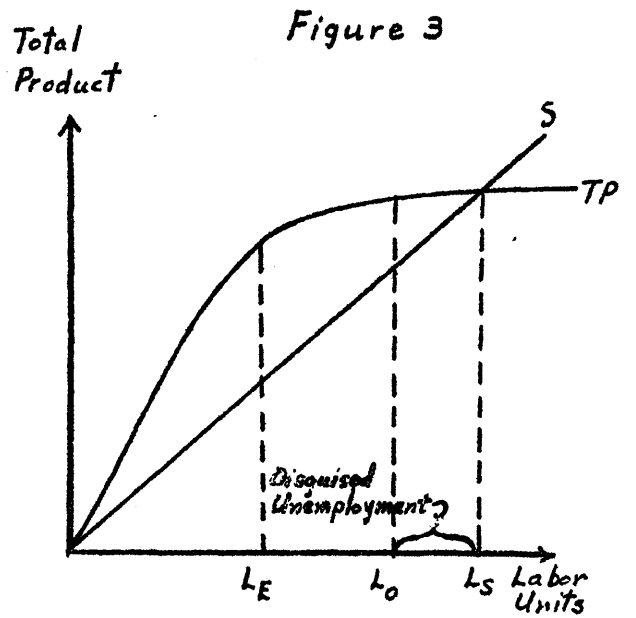
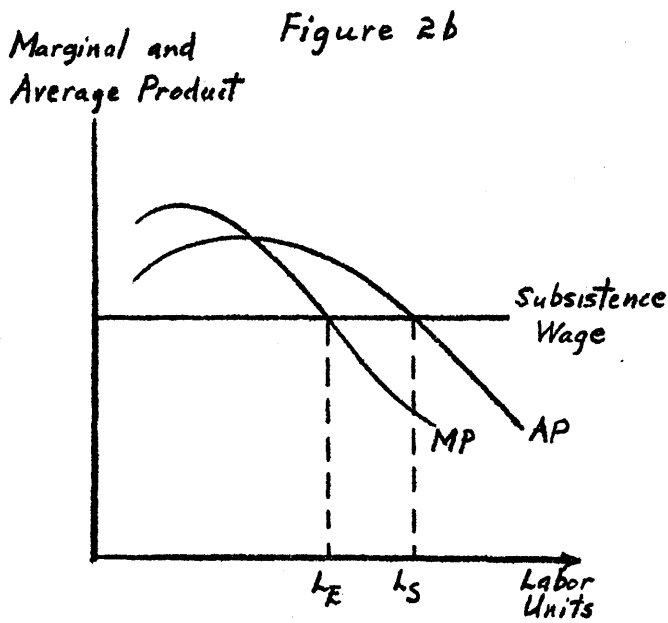
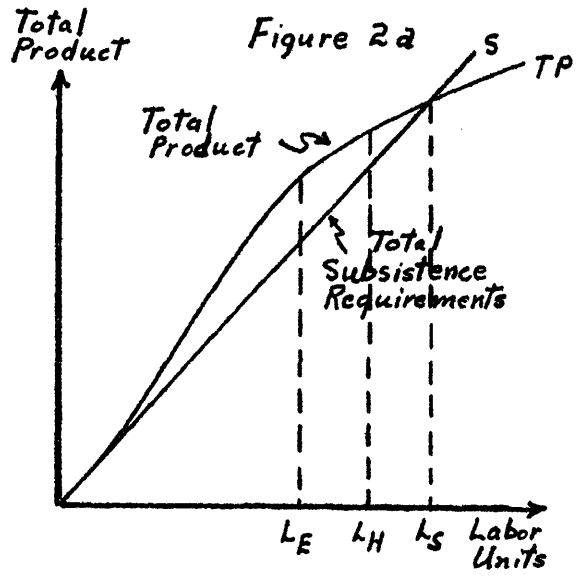
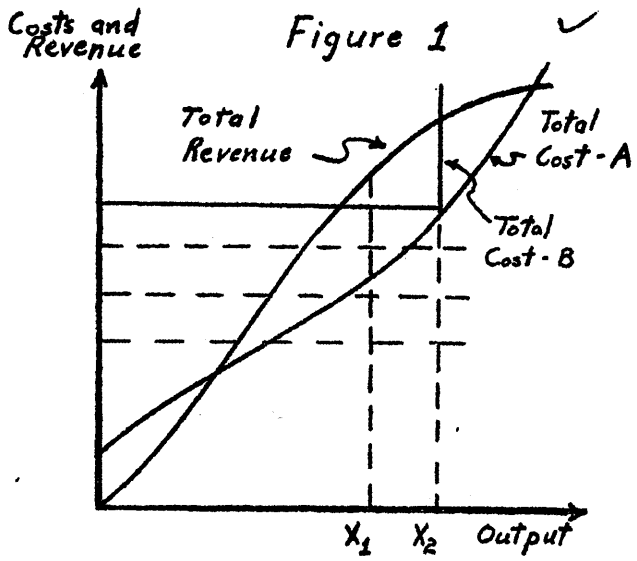
1. Although the total revenue curve as shown does, perforce, embody some assumptions about the variation of demand, these are only incidental; the argument does not hinge on them.

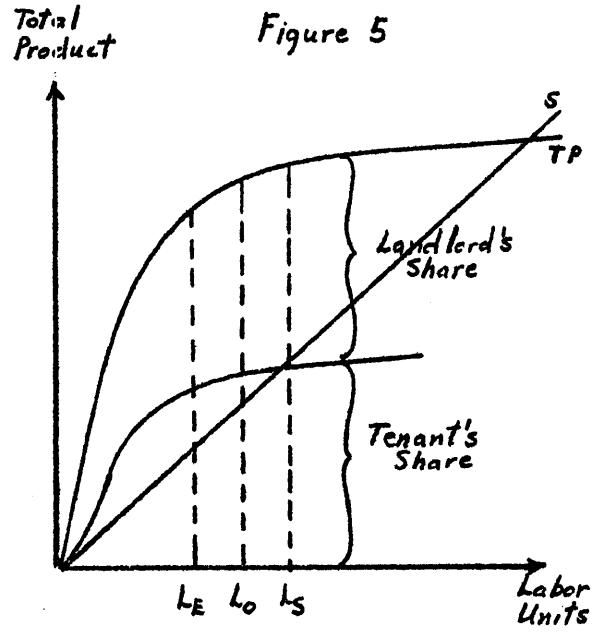
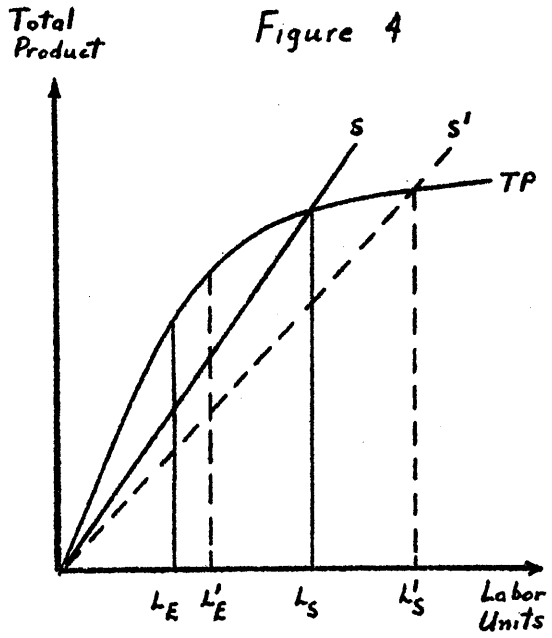
output X_1 . It is just as likely, and under some conditions more likely, that they will end up at a point like X_2 which is dictated by the available household labor supply. The total cost curve B is drawn to indicate that the household considers it impossible to achieve outputs higher than X_2 .

The importance of the "organization" of the firm for output and factor combination decisions can be made even clearer by use of another type of graph as in Figure 2a and 2b. These show, for a "representative firm", the variations in the total, average and marginal products with different amounts of labor, given a fixed amount of complementary resources such as land, and, also, the wage payments to labor.¹ If the wage rate were such as is indicated by the slope of the wage payments line the profit-maximizing employer of labor would use L_E amounts of labor. If this were a household firm with L_H amounts of labor available, that amount would be used.

Suppose the firm of Figures 2a and 2b is in a subsistence sector. Labor would be available at subsistence wages, at least as a long-run condition, if the subsistence position were a stable equilibrium. For unstable subsistence equilibria, subsistence wages are only a transitory phenomenon and we shall, therefore, not concern ourselves with this case. The character of the population growth mechanism which keeps the economy at

1. The curve as drawn indicates that technology is not so limiting that there is no problem of adjustment of labor supply. The adjustment possibilities also may not be as smooth as shown in Figure 2.





subsistence need not detain us at this point either. A simple Malthusian mechanism or one of the more realistic models presented by Professor Hagen¹ may be assumed to be operating. The wage payments line in this case would represent the total subsistence requirements of different amounts of labor.

If can be seen from Figures 2a and 2b that equality of total output with the total subsistence requirements of the population implies that the labor input is L_B , where average product is equal to the subsistence wage. Expansion of the labor supply to L_B would be the result of a Malthusian process where firms are family-owned and labor is essentially self-employed. Although the "last" units of labor would not be earning their keep, distribution of the total product over the labor supply would just cover their subsistence requirements. The profit-maximizing employer of labor, however, would use labor units only up to L_E where the marginal product is equal to the subsistence wage; at that point rents, indicated by the distance between the total product and total subsistence requirements curve in Figure 4a, would be a maximum. The Malthusian mechanism in this case clearly leads to quite different results than in the case of self-employed labor.

Although "Malthusian" population growth is required to push the labor input all the way to L_B , even in non-Malthusian conditions tendencies exist among self-employed labor and family firms

1. E. E. Hagen, "Population and Economic Growth," American Economic Review, Vol. XLIX, No. 3, June 1959, pp. 310-327.

to push the input beyond L_E . These would, moreover, not necessarily be irrational. It is the employer of labor who clearly should maximize profits. However, if alternative opportunities do not exist for the family labor in excess of L_E , or if the conditions of such opportunities are considered quite undesirable, the excess labor will be used to maximize the return on the total available resources, which includes both capital and labor. As suggested above, it cannot in general be assumed that families adjust their sizes with a careful eye on the labor supply position which gives the greatest surplus over subsistence requirements.

If firms of entrepreneurial-employers appear they will displace self-employed and family firms which operate as shown in Figures 2a and 2b where there are diminishing returns to labor. The entrepreneurial employers, using labor more efficiently will make profits (or rents) and can use these to undercut the self-employed and family firms. If the latter are already at the Malthusian limit L_E they will be forced out of the sector as they are pushed below the limit. If such firms are short of the Malthusian limit they have some amount of rents to cushion the blows of competition.

If there are constant or increasing returns to labor, i.e. no scarce "second" factor, then, of course, the employer-entrepreneur has no advantage over the self-employed or family firm.

Figure 3 includes a total product curve in which the marginal productivity of labor is zero after L_0 labor inputs. If subsistence

requirements are shown by the curve S then the Malthusian limit to growth of the labor supply is L_E . Families which, for one reason or another, do not grow to that limit will have higher per capita incomes than families which do. This is particularly clear in the case of Figure 3 because all labor beyond L_0 will be "technologically" unemployed, and contribute absolutely nothing to their own subsistence requirements. All labor beyond L_E adds less to output than it consumes so family growth beyond that point will affect savings and future income.

Rather than pursuing these comparisons abstractly we shall now turn to specific consideration of particular economic sectors. The previous analysis of subsistence economies and the comparison of the resource use of the employer-entrepreneur and the self-employed will be used to interpret current conditions in underdeveloped economies, subsistence sectors in advanced economies and historical patterns of development. In the following treatment these theoretical models will be used as hypotheses to explain economic patterns both static and dynamic.

III. Sectoral Patterns in Subsistence Economies.

A. Agriculture.

Agriculture, both in advanced and underdeveloped economies seems to have a special mystique and, indeed, it is often different in some essential respects from industry. One such difference arises out of the nature of the product: it often makes possible the creation of a subsistence or even an expanding livelihood with

only a small degree of involvement in markets either for labor or products. Another difference in many areas is the relatively greater frequency of single proprietorships in agriculture as compared to industry. The ability of farmers to isolate themselves from markets helps explain the persistence of individual ownership of land, and of lower productivity in agriculture than in industry. It also helps explain the "irrational" pursuit of land ownership on the part of peasants who have had unpleasant experiences of the instability of markets. Of course, if Malthusian population growth has proceeded to its limit in agriculture then it no longer can serve as a refuge against misfortune.

The nonmonetization of a rural sector is not a crucial characteristic of a subsistence situation. All the transactions necessary in a subsistence or growth economy, at least in small, local economic units, can take place without monetization. Saving can be done in real terms and investment carried out by providing goods in payment. The fact that monetization is not a necessary characteristic of a growth economy does not, of course, mean that it is unimportant. We do not have to repeat here the functional advantages of a money system. Monetization and participation in markets do not, in turn rule out subsistence agriculture. Subsistence or near-subsistence economies or economic sectors with local, virtually complete self-sufficiency are known; so also are economies with some mixture of cash and subsistence crop production. An agricultural sector may supply output to international markets and behave

in a Malthusian way and, for that or other reasons, be at subsistence income levels. There is no necessary relationship between "self-sufficiency," "monetization," "poverty" and "savings" over a range of income which covers both subsistence and growth situations. A little diligence in searching seems to be all that is necessary to find empirical counterparts of all the logical possibilities.

The analytical descriptions of types of subsistence economies in Section II help to provide a general perception of the characteristics of such economies and some possible patterns of change. But an over-all view may miss economic features which are crucial. For example, an increase in aggregate savings in a country in which a strong, central government committed to economic development displaces a weak and traditional government can be described as a shift in time preference. Government tax and expenditure policy is a phenomenon suitable for macroeconomic analysis. Technological change imposed in large "lumps" from the outside can similarly be analyzed effectively on a macro level. However, when the sources of the change are widely dispersed and micro in character in aggregative analysis is less useful as much of what is important is averaged out in reaching the "typical" consumer and producer. We now want to take one step further and go behind the aggregate patterns

The "typical" consumer-producer is an adequate representative when there is a rough equality of income distribution and in a society which by tradition or other means imposes a general conformity in production and consumption. It is possible to find actual counterparts of such economies at the subsistence level. Such uniformities may arise from community ownership of land and division of produce. An example would be the traditional economies in certain African areas where the tribe, or extended family group, practices a shifting cultivation without private ownership of land or its produce.

More common, undoubtedly, are societies with marked income inequalities. These may arise from a variety of sources which deserve examination. The rate of saving in any economy is at least partially determined by the degree of income inequality. Therefore, understanding of the impact of changes in technology, taxes and land reforms requires evaluation of their effects on income distribution. As pointed out in Section II above, entrepreneur-employers use different resource combinations with labor than self-employed owner-operators of farms. Such differences can be expected to lead to income inequalities. For the moment, however, these types of factors will be set aside and other sources of income inequality considered.

There are many types of "random" events which would create income inequality even starting from an initial position of equality. Individual differences in productive ability, inheritance

practices, varying local land fertility and water availability are all examples. The social demands of religion, custom and family can create inequalities--where heavy dowries must be given to daughters upon marriage, the bad luck of having many daughters can ruin a family fortune.

These randomly operating influences, while preventing the maintenance of equality, may also operate under certain conditions to reduce the likelihood of increasing or even permanent concentrations of agricultural income.¹ Families with a run of luck in having good crop yields, few daughters and dutiful sons can expect a run of bad luck to follow. Ability to survive a run of bad luck depends on the individual's or family's wealth and on how close the family is to minimum subsistence requirements. The preservation of land ownership is, of course, particularly crucial for the maintenance of future income. Since longer runs of bad luck are less likely than short runs, the larger the wealth position and the greater the "surplus" above minimum subsistence the greater the likelihood of survival. If land holdings, for one reason or another are small, that can be evidence of the inability of the family to establish sufficiently large wealth positions to insulate themselves against vicissitudes. Such small holdings may also be the sources of such inability.

1. F. G. Bailey, in Caste and the Economic Frontier, describes an Indian village society which seems to fit this pattern. But life is full of variety. Louis Lefebvre tells me that Transylvanian peasants rigorously limit the number of the offspring which can remain on the farm just to avoid splintering the family landholdings.

This reasoning suggests the significance for rural income distribution patterns and, therefore, rural savings, of relationships between products, technology, land availability and family size. There are constellations of these factors which could, in relation to the randomly operating influences on income and wealth described in the preceding paragraphs, effectively prevent permanent income concentrations. Suppose, for example, that because of the technology used land holdings are small relative to family size so that incomes are near subsistence levels. If, for the given particular range of products, there are sharply decreasing and finally zero marginal returns to labor over the "normal" range of family size, it will be quite difficult for families to accumulate a "cushion" against misfortune. Thus, in this case the random vicissitudes of life will be effective in preventing increasing or "permanent" inequalities in income and wealth.

A change in technology to create a range of constant or increasing returns, a change in product to create a margin above subsistence, a change in "normal" family size, all will change the tendencies toward income equality.

The point made earlier that the levels of income regarded as equivalent to subsistence are, short of the physical minimums, themselves variable must also be taken into account here. This is demonstrated in Figure 4; though the labor supply was already at subsistence levels at L_s , an increase may still occur to L_s'

which drives down subsistence to S' . The new maximum profit position also changes to L_E' . Even within any locality, the rough equality of rent and individual wages will mean varying amounts of subsistence depending on family size and similar variables.

Such changes, when they do occur, often involve changes in individual positions from farm owner-operators to tenants or laborers or even landlords. In many rural areas, moreover, these roles are not fully differentiated so that the same person will act in more than one capacity. Changes in individual economic circumstances, rather than resulting in a sharp and abrupt shift in status, will, in such cases, mean a shift in importance of one of the roles and, perhaps, the partial assumption of a new role. As pointed out in the previous discussions of Figures 1 and 2 the use of labor with other resources by the profit-maximizing landlord is quite different from that of the owner-operator. Thus it is necessary to take the patterns of land ownership and operation into account when discussing tendencies toward subsistence and inequality in incomes in rural areas.

All that was written above about the vicissitudes in the life of the owner-operator in the rural sector can be extended to economies where at one stage of wealth, the owner-operator becomes also a landlord. The chances of inheritance and family size which may have been responsible do not, however, automatically make him into an acquisitive profit-maximizing employer-entrepreneur. A shift from owner-operator to profit-maximizing landlord may

also require a change in the social structure as well as personal attitudes. The landlord in this case is only in a somewhat more favored position than the owner-operator and the concentration of land is subject to the attrition of random processes similar to those which created it.

There are, of course, many sources and kinds of landlords and many kinds of landlord-tenant-laborer relations. The landlord who holds title as the result of ancient coercion is no more necessarily a profit maximizer than the one who has achieved his position recently by hard work and good luck. They sometimes behave as if they have a community of interest with their workers and tenants who in turn are simply interested in maximizing the return to their labor or in maintaining subsistence. This is one pattern of the "benevolent" patron who, from his "original" land endowment provides employment for all his client families, takes the share of product necessary to maintain his position and provides, at least, subsistence for his workers. He will, in a growing population, eventually be "over-employing" labor just as if it were self-employed.

In many instances landlords will not have, or think they have, complete freedom of choice in levying rents on their tenants or in setting wage payments to their labor. We need not elaborate here on the power of traditional institutions and ways of thought. Even if it occurred to landlords that the optimal use of labor was at the point where its marginal product was equal to its wage, it might not occur to them that they should actually try to move to

that optimum position. And, if they did try to move they would likely again find traditional barriers to change.

However, when it is recognized, the maximum profit position must be very attractive and must generate strong pressures for movement to that position. We need not commit ourselves to a complete economic determinism to explain certain features of rural subsistence sectors as at least partially the result of the attempts of landlords to maximize their rents. But, even if landlords manage to use the optimal amount of labor and earn maximum rents that in turn does not guarantee that they will have a high savings rate. It may only lead to high living. The picture of the traditional landlord in many parts of the world is that of an avaricious individual but with a high rate of time preference.

However, as pointed out above unequal incomes are not simply the result of landlord-tenant relationships but spring from a variety of sources. In a subsistence economy the savings of one group are matched by the dissaving of the rest. In effect the group with a surplus above subsistence will provide what is literally a wages fund for the income group below subsistence. This transfer is achieved by loans from the net-saving group to the net dissaving group. The typically high interest rates provide the mechanism by which consumption is made more equal than incomes. Such interest rates in subsistence agriculture are, in considerable part, a reflection of extreme poverty which creates not only a willingness, but a necessity, to exchange future for present consumption on the

part of the borrower. We should not be surprised to find a phenomenon like this in India, for example, in which peasants must use their fertilizer for fuel instead.

Though income inequality and high interest rates are not only the result of landlord-tenant relationships, these relations do, of course, often play a major role. Tenants, for various reasons will tend to behave like owner-operators. They may, in fact, have a dual status, and may be intermixed in the village with landlords. If they can force down rent payments sufficiently by claiming higher subsistence requirements, there is no reason why they should not add to their families. However, rent contracts are generally not changed with each addition to the tenants family. Conventional rents may leave a surplus for a small tenant family but can work drastically against growing families. These latter in subsistence economies will finally have to borrow against the future for consumption loans.

In turn the optimizing landlord would find it advantageous to fix rent contracts which leave less than subsistence, lending back part of the output at high interest rates. Accumulation of interest serves to perpetuate the arrangement and the pressure on tenant's subsistence. This arrangement also gives the landlord control of a larger part of the inventories which is often desirable where harvests and transport are uncertain. It shifts the task of calculating the workers subsistence to the price system via the interest rate and eliminates the necessity of changing the rental

fees with each harvest. Interest rates and rent charges are thus closely related in subsistence economies.

Share cropping arrangements represent the abdication by the landlord of the attempt to maximize his returns on his land, or, perhaps, the existence of institutional barriers to his doing so. For example, in Figure 5 the profit or rent-maximizing position, given the wage rates for labor as indicated by S , is using L_E units of labor. But if total returns are divided by a share cropping arrangement as shown, the landlord's interest, like the tenant's becomes the maximization of total product with the given factor availabilities. At L_0 , the marginal productivity of labor is still positive and the tenant's share is below total subsistence requirements. In this case there is "room" for Malthusian population growth to L_g . There is also an incentive for the landlord to further subdivide the land and add sharecropping tenants even beyond L_g labor units as long as marginal productivity is rising. Although the sharecroppers returns are less than subsistence requirements at L_g , the landlord may yet be able to expand output beyond this point if there is "part-time" labor available.¹

The ability of the landlord to keep his tenants at subsistence depends on the alternatives available to them in land or other employment. When land is abundant relative to the population, as

1. It is a familiar point that capital investment in agriculture by either tenant or landlord will be discouraged by sharecropping, unless on a cooperative basis, as only a fraction of the marginal return will accrue to the investor.

in the United States, and when tenants can also move easily to other employment the power of the landlord is limited. But where the cost of movement is great, either in terms of economic resources required or in terms of the cultural shift involved, the landlords' power to force the tenant to subsistence will be greater. It is this, we suggest, as well as relative lack of financial institutions in rural areas which explains the observed increase in rural interest rates with the distance from urban centers in India, for example. Such patterns would probably also be found in other countries.

The functions of rent taking, loan giving and interest-collecting and inventory controlling are often combined because they are closely related in rural sectors. But they may also be and often are performed by different sets of people. In the latter case landlords can find themselves in a situation analogous to that of their tenants in that they are forced to subsistence levels by the moneylender-merchant. While this leaves the moneylender-merchant in control of the surplus above subsistence his use of the surplus for productive purposes will depend on many personal and cultural as well as economic factors.

In a country under population growth pressures and in which landlords have been successful in restricting labor to the point where total product is less than total subsistence wages, the demand for land reform, i.e. the distribution of land to tenants and laborers, can be expected to be great. These latter groups

easily recognize the advantages of ownership of the scarce factor. Depending on landlords and tenants consumption patterns there may be no decline in saving as a result of land reform. But, if as the result of land reform all the former rents are eaten up by larger families a drastic change will have occurred in population which will make future improvements in per capita income much more difficult than before the land reform. Once the rents have been destroyed by population growth, it is difficult to recapture them for productive savings. New sources of saving will then have to be created by technological change, shifts in time preference and so on. Land reform can be a downhill road if it is not constructed carefully.

In a community in which landlords or employer-owners try to maximize output rather than profits or rents, the emergence of a class of optimizing entrepreneur-employers must be a profoundly disruptive development. If they can obtain land, they can earn profits, because they need pay no more than the going subsistence wage. Since they are more efficient in their use of labor they can command larger markets and displace existing producers. They may introduce new products and new technology if those permit a better adjustment of labor force to the available land. If they are savers they will accumulate land. In the process they are bound to displace labor and cause unemployment. They end by transforming the countryside.

The changes from traditional adjustments to new marginal adjustments can take place independently of changes in technology and/or products. However, these can provide the occasion for the entrepreneur-employer to emerge and begin his far-reaching changes. In the economic turmoil engendered by technical change, resistance to other types of breaks with tradition may be lowered. On the other hand, it seems reasonable to expect that in the ferment which accompanies the emergence of a new employer class the barriers to technical change will be lowered.

B. The Nonagricultural Sectors.

The maintenance of life even at low subsistence levels does not imply an absence of manufactured products. There can be a variety of manufactured goods produced although not as wide a variety as within advanced economies. These goods will form part of subsistence consumption or part of the gross investment required to maintain the capital stock. Over-all subsistence does not necessarily imply handicraft technology either. However, in such economies there is likely to be a good deal of labor intensive home craft because of the low marginal productivity of labor on the land.

Textiles are a classic example of a subsistence manufactured good; utensils, tobacco products, processed foodstuffs are others. There is a great deal of variety in what are considered the "essentials" of life not only because of culture differences but also because of climate and resources. We suggest that the prominent role of textiles in economic development is due to its high rank

as a subsistence good. If there are surpluses in income above food requirements it is the demand for textiles which expands before other types of goods. This ranking could also be made in terms of sensitivity of demand to interest rate changes, which would indicate the "postponability" of its consumption, or in terms of the income elasticities of demand at subsistence income levels.¹

Associated with income inequalities there will be, even in a subsistence economy, a demand for luxury goods: house furnishings, expensive textiles, ornaments and, in recent times, automobiles, appliances, and so on. This luxury demand may be sufficient to support a sizeable industry, as, for example the Benares handicraft silk industry.

Government even in a subsistence economy will also call forth supply for its particular requirements so that, for example, an armaments industry could develop based on the military requirements.

Though without net saving and investment, a subsistence economy would have gross saving and replacement of capital. These requirements can be sufficient to support a small capital goods sector producing, say, agricultural implements. While the industry may be of a village character with the local blacksmith producing the required implements, it may alternatively become quite substantial and highly organized.

1. The character of the recent Indian inflation makes clear, if there was any doubt, that textiles have less of a subsistence character than staple foods. The rise in food prices due to a poor series of crops has led to a fall in demand for cotton textiles.

These varied demands even at subsistence levels can support a producers goods industry, a minerals-producing sector, a chemical industry and even a substantial service sector. While it is true that a lesser variety of goods will be produced in low income than in advanced countries, it would be mistaken to conceive of all subsistence or near-subsistence economies as being simple food producers.

In a self-sufficient village economy there would be little need for a separate transportation sector, since the peasant would provide his own with possibly some slight specialization of function. In such a village economy the introduction of railroads or highways would have little effect via reduction of transport costs, since, due to lack of surpluses, relatively small amounts of goods would move in trade. However, to the extent that there were local specializations either in agriculture or industry, transport costs would be an important element. The use of labor and other resources in manufacturing in subsistence economies can be analyzed analogously to agricultural sectors. As pointed out there will be some demand for manufactured products even in simple economies. In filling this demand the manufacturing sector will combine labor with other resources in proportions depending not only on available factor endowments but also on the organization of the "firm."

Suppose we imagine the manufactures being supplied by small artisan industries. The working force in these industries may be

subject to Malthusian population growth just as in agriculture. Subsistence requirements, even if at different levels for the artisan sector than for agriculture, will operate analogously to limit population growth. In fact, of course, the artisan workers are often closely intermixed in villages with agricultural workers. There are societies, however, in which they are segregated in their own villages or urban areas.

The behavior of the self-employed artisan in using labor with other resources in a Malthusian sector can be analyzed as in Figure 2b. Labor inputs would tend to expand to L_s where average product was equal to subsistence. There would be randomly operating factors similar, but not identical to those described for the rural sector; these would tend to create inequality and also to prevent its being permanent. Much of the artisan sector would not be affected directly by variability in weather, water and land fertility and, therefore, would be relatively immune from that set of random influences. We can also find in subsistence artisan industry the phenomenon of high interest rates associated with subsistence agriculture; such a phenomenon would arise from similar sources and have similar functions to those in agriculture.

One element seems to be lacking in creating a substantial similarity between conditions in agriculture and artisan activity: the landlord. But in fact he has his cousins in manufacturing. The landlord owns the scarce agricultural resources of land, and, perhaps, capital. To gain access to these in a Malthusian

economy, or, more generally where no alternatives are available, the rural worker must bid his wages down to subsistence. The landlord's cousin in manufacturing owns the inventories of raw and semifinished capital and perhaps, tools and equipment. To obtain access to these the handicraft worker without alternatives will also have to accept subsistence wages. This pattern in artisan industry will probably be most clear where the capital (especially inventories)--output ratio is high for then the accumulation required of the individual artisan to establish and remain an independent, self-employed worker is high relative to his income.

The "cousin" who performs the landlord-like functions in artisan industry is the merchant or the Verlager, the operator of the putting out system, or the factory employer. As in agriculture here also landlords and their cousins are not necessarily economic men in making optimum use of labor with their other resources. And even when they try to be, they run into the barriers of traditional patterns of organization of economic activity, traditional wages and prices. Nor can permanent inequalities which do exist be guaranteed to result in saving and productive investment rather than high living and/or gold hoarding.

In artisan industry also the disruptive influence of the entrepreneur-employer in a subsistence sector of self-employed owner-operators or traditional and "inefficient" merchants and workers is profound. It may, in fact, be easier to perceive the

effects of the intrusion of the entrepreneur-employers in manufacturing than in agriculture. Since he combines labor more efficiently with other resources than do the self-employed he will make profits. By offering his goods in competition with the self-employed who are already close to subsistence, the entrepreneur-employer can make use of his profit margins to cut prices and force his competition out of business. It is easy to imagine this happening on the lowest level on the local market-days when the entrepreneur-employer or his agent offers his wares in his stall at lower prices below those which can keep the shop-keeper artisan and his family alive. Of course, if the self-employed artisan is above subsistence there will be some cushion which will soften and delay the effects of this radical change in business organization.

The process of displacement may take many forms. If the artisan is at subsistence levels the entrepreneur-employer can make an offer to him to buy his inventories and employ him at the going wages. More of other resources can then be given to the new employee and the profits taken by the employer. One result of the process is likely to be unemployment as other artisans are displaced. The capital-labor ratio and the marginal and average productivities of labor in this case will rise.

Another somewhat different and important pattern can be observed. Suppose labor has a primary occupation which satisfies part of its subsistence requirements. Then, if it has no alternatives it must accept, and can be hired at wage rates which are at

less than subsistence levels but at least equal to its marginal productivity in its primary occupation. This may make it possible for entrepreneur-employers to use labor more intensively than it is used by household firms.¹ In agriculture the primary occupation will typically be a small plot of land owned by the individual family. But, as explained above, such ownership cannot persist, in the absence of some special conditions of production or institutional protection, against aggressive employer-landlords. The fact is, however, that small land-owner-farm wage-laborer combinations do persist, this indicates either that the necessary protective institutions or production conditions exist, or that aggressive landlords are absent.

Industrial employers can similarly make use of labor at wages less than subsistence rates or the going rates in household firms, if the labor employment is in addition to an occupation which pays at least the other part of the worker's subsistence requirements. It is quite common for agriculture to provide the alternative occupation in many industrial complexes. The "mill town" represents the location of a factory exactly to take advantage of such possibilities. Industrialization which makes use of a labor force whose ties to agriculture have been broken must pay at least subsistence wages, and employers lose an advantage they might otherwise have. Part of the success of Japanese industrialization may be explained by the persistence of this tie.

1. This point emerged from a most useful conversation with Professor P. A. Samuelson.

As pointed out in the discussion of analogous developments in agriculture, technological changes may be associated with the changes in work organization which are in turn associated with the emergence of employers. These changes will, in fact, often be closely interdependent. The exploitation of new technology may involve operation at levels not achievable by individual, self-employed artisans and thus would be an incentive to the emergence of a class of entrepreneur-employers. On the other hand, the existence of such people would, in turn, be a stimulus to the development of new technologies. However, the role of the innovator of new technology is logically and, often, practically distinct from the role of the employer who uses existing technologies with different factor proportions than the self-employed. The close relation of the roles has tended to blur their distinctions and the prominent place given to the technological innovator in economic theory and history has somewhat obscured the significance of the social innovator who acts as a profit-maximizing employer in sectors formerly characterized by self-employed.

Much of what has been written about agriculture and industry can also be said about the service sectors: wholesaling, retailing, repair, and personal services and so on. Organizational forms and production methods can run the gamuts described in agriculture and manufacturing. It is often hard to distinguish manufacturing from service firms. This distinction is most difficult when the firm produces items to order rather than for stock and general distribution.

In the case of production to order the conditions of sale are more like the sale of services. Goods produced to order are likely to be less standardized than goods for general distribution and, for this reason, less subject to competitive pricing pressures.

Conditions of production, variations of output with factor inputs, and contacts with other sectors are likely to be different for service industries than for agriculture and manufacturing. These differences will, in turn, affect the ease of entry into services and the movement from service into other sectors.

C. Technology and Technological Change in Subsistence Economies.

Subsistence conditions do not necessarily imply that the marginal productivity of labor is zero but only that it is less than or equal to subsistence requirements of labor. However, there may very well be disguised unemployment in subsistence sectors as shown in Figure 3 above. Various rigidities, social as well as technological will prevent such unemployment from being spread over the entire economy. Seasonal unemployment is common in agriculture, for example, even in relatively sparsely populated areas. When the marginal productivity of the labor of the family on the land falls to zero it can and will occupy itself in other types of activity if that is feasible. Manufactured goods which can be produced by home crafts will be. If they are not, it can be regarded as evidence that it is not technically feasible, or not economic due to other resource requirements even when the imputed wage in agriculture is zero; or it may be that the wage,

in fact, is not regarded as zero. This may be due to social and prestige factors or the existence of alternatives with positive returns.¹

Technological change can occur in a low-level subsistence economy even in the absence of net investment by replacement of fully depreciated capital with equipment embodying new and different technologies. The effect in such cases will be to displace traditional methods, say an artisan group, with factory production. This effect will be even more profound in static than growing economies. It is impossible to estimate, but it is certainly conceivable that the replacement of the traditional handicraft textile worker in India by the modern mill industry did not lead to any increase in total capital invested in producing textiles.

Replacement of traditional methods with technologies in which available factors are more productive is the equivalent of a windfall gain in wealth. The resulting rise in output could set off a process of growth, depending on whether savings increased or whether the higher output was absorbed by greater consumption, including the possibility of population growth.

Thus technological change is not inconsistent with a low-level subsistence economy. The historic concern with technological unemployment suggests that this is the case. To put the issue

1. The latter factors help explain the apparent lack of success of the rural hand-spinning program in India. The supposed surplus labor on the farms may not be surplus at the wage offered or may be kept back by prestige considerations.

positively, it is our hypothesis that in subsistence economies the motive for investment in technological improvements is in the displacement of existing techniques rather than for satisfaction of expanding markets. Investors of the latter type would indeed have to worry about "balanced growth" and their dependence on satisfaction of such growth conditions would be so great as to discourage the investment. However, investors in new technology can, and we suggest, typically do count on gaining markets by displacing older methods. It is a much surer market than that promised by growth.

Technological change, in turn, often requires organizational changes in the economy. New techniques may require "lumpy" investments, even if gross and not net, and these may be virtually impossible for an individual artisan enterprise system. The technological innovator must, therefore, also often be a social innovator as well, and combine both functions in the role of the entrepreneur-employer.

One special area of technological change and investment is in transportation because it does more than reduce some intermediate costs. It can connect formerly isolated regions with different relative prices and thus make possible gains from specialization and trade.

Conclusion.

Economic growth historically has taken place in a variety of ways in terms of the stimuli which have set it off, the sectors

within which it has been initiated, the patterns in which savings and investment have been generated, and so on. Future development is bound to add even more variety to the picture. The focus of this paper was on the conditions of static, subsistence economies. These too show great variety. It was our intention by trying to analyze and organize this variety to illuminate both the barriers to growth and its sources. It is clear that underdeveloped economies may be virtually one sector economies, pastoral or agricultural, with varying degrees of income inequality, depending on the type of land ownership system that exists, the degree of mobility, and many randomly operating influences having their sources not only in the conditions of production but also in the patterns of consumption. However, subsistence countries may also be not only multi-layered socially, but multi-sectored occupationally, producing a wide variety of consumer and capital goods. The most advanced technologies can be used in some sectors while others remain technologically primitive though often optimal in terms of the existing factor endowments. Subsistence economies need not be either simple, in terms of their economic structures, nor unchanging.

Among the types of changes which have been most commonly considered as having an effect on growth in subsistence economies are changes in factor availabilities and technology. These are undoubtedly significant and far-reaching. It is not to minimize their importance that we have emphasized here the changes in resource combination which are associated with changes in the

distribution of their ownership. Recognition that such associations may exist creates major complications for the testing of hypotheses about the effects of technological or organizational change. The complications are essential, however; identification of one type of change must take into account the possibility of the other.

Finally a similar point can be made about the emergence of profit-maximizing entrepreneurs. Their appearance depends also on the existence of forms of economic organization in which profit-maximization makes sense and is feasible. If such forms do not exist and cannot be created due to institutional restrictions, entrepreneurial activity comes to nothing. To identify changes in entrepreneurial activity with the evolution of individuals with the appropriate motivations requires also the identification of the role of changes in the forms of organization of economic activity.